Roles Of The Blind And Visually Impaired In Software Engineering

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Introduction

To figure out what each person needs in terms of accommodations, it's important to know the difference between being blind and having bad vision. For example, someone with low vision might benefit from magnifying glasses, high-contrast visual aids, or special lighting. On the other hand, someone who is blind might depend on Braille or audiobooks to get around and read information. Some people see nothing but darkness, while others may feel light or be able to make out shapes or hazy shadows. Getting used to being blind is a very personal process that is affected by the resources a person has access to, their strength, and the help they receive from their community. A lot of wealthy countries, including the US, have come a long way in protecting the rights and making things easier for people with disabilities, like the blind and the low vision. The Americans with Disabilities Act (ADA) of 1990 is a major civil rights law that ensures that people with disabilities are not discriminated against in any area of public life. This includes jobs, schools, public transportation, and all other public and private places that the public can access. Technology has made it possible for people who are blind or have low vision to be more independent and improve their quality of life. It has also given these people legal rights. Devices that work with your voice, Braille displays, and screen reading apps have made it easier than ever to get information. People who are blind or have low vision can get around more easily thanks to mobile apps that can recognize objects, help with directions, and even identify cash. Building on the progress made in disability rights and mobility, it's important to recognize the problems and chances that blind or visually impaired people face. Such as bias, prejudice, or a wrong understanding of their skills and the problems they face every day in school and the job market, especially those in STEM fields who like to program, analyze data, graph data, etc. To keep the talk on track, this paper lists the important roles Blind people can work on making high-quality software goods at both the beginner and advanced levels. The first thing we need to do is explain what Software Engineering is. Software engineering is one of the main fields of study in computer science. It includes all the steps needed to make, test, and keep up with software systems and apps. This field is very important for making technology that solves hard problems, does boring jobs automatically, and makes life better for everyone around the world. By combining technical knowledge with engineering principles, software engineering tries to make software products that are reliable, efficient, and flexible enough to meet the needs of a digital world that is changing quickly. Also, the unique point of view of a blind person can greatly advance the field of software engineering. Their ideas can improve many things, from the style and layout of software to making sure it is accessible and works with different ways of using it. Additionally, their feedback can assist in meeting government and business rules about diversity, inclusion, and usability standards. Blind software engineers can support apps that meet ethical and legal requirements for digital inclusivity by using the first-hand accounts of visually impaired people. This way, they can reach more people. Also, blind people's ideas about programming tools are very useful. Getting around in a world that is mostly visual has helped them get better at fixing problems and being creative. With these skills, software can be made that is easier for everyone to use and can be enjoyed by everyone. For example, interfaces that prioritize haptic or aural feedback may lead to improvements in technology that is more inclusive and engaging. It's important to stress that the work of blind software writers shows how much diversity and inclusion are needed in the tech industry right now. This kind of diversity not only makes it easier to solve problems, but it also helps people make software that takes a bigger range of human experiences into account. In turn, this has many positive effects on other areas and STEM fields. In this study, we look at the important roles that blind people play in software engineering.

Figure 1: Pearl Portable Magnifier and Reading Camera

Figure 2: OpenBook OCR Software Scanner

Model Analysis

When writing about the experiences of visually impaired people working in software engineering, the literature shows a history path shaped by major challenges and ground-breaking successes. At first, it was hard for visually impaired people to get an education and get a job, especially in technical areas like computer science and engineering. Textbooks and other resources were mostly pictures, and people didn't think people who were visually impaired could do as much as they could. Even with these problems, early adopters like Dr. Abraham Nemeth changed the way things were accessible by creating the Nemeth Code, a Braille system for math that made it easier for visually impaired people to participate more fully in STEM areas. This review goes from early problems in schooling to recent advances in technology that make it easier for more visually impaired people to work in software engineering. It looks at how changes in laws, like the Americans with Disabilities Act (ADA), and technologies, like screen readers and Braille displays, have made it easier for visually disabled people to work, making the workplace more welcoming in STEM fields and beyond. As a blind student, I started a fascinating career in software engineering. Apart from imparting knowledge, my experience also provided me and my classmates with drive. My visual impairment caused obstacles, but I was determined to achieve and contribute significantly to our class tasks. In the fresh man year, I came up with a fresh idea for a big project is one of my fondest memories. My professor appreciates its uniqueness and usefulness. As a result, my lecturer chose to adopt my suggestion for the whole class. This choice emphasized my inventiveness and aptitude in the field where visual signals are frequently considered crucial, giving me a great sense of pride and validation. After that, I started to contribute significantly to the project's advancement. My classmates came to me often to get help with various parts of the assignment, and I used my knowledge of software engineering ideas and adaptive technology to help them solve difficult tasks. I became more than just a standard peer, I became a mentor, an innovator, and a living example of how to overcome obstacles with brains and resilience. The foundation for my investigation into software engineering research methodology was also established by this endeavor. I concentrated on how inclusive design concepts may be incorporated into software development processes to improve accessibility for all users, including those with disabilities. My academic and practical expertise were enhanced by the insights I received via qualitative research, which involved the use of questionnaires and interviews. My enthusiasm for software engineering was nourished by this experience, which also cemented my standing as a leader and supporter of accessibility in technology.

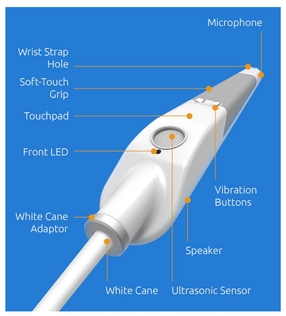

Figure 3: WeWalk Smart Walking Cane

Figure 4: BookShare Reader

Research Model

Figure 5: OrCam Read LV Handheld

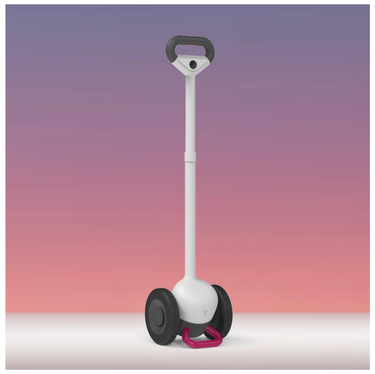

Figure 6: Glide: Intelligent Guide for the Blind

To get both qualitative and quantitative data for this study, the methodology uses a number of different methods. Literature reviews give historical background and show how technology advances have affected the ability of visually impaired people to work in software engineering. In-depth case studies show how these technologies have changed people's personal and professional lives in the field. Interviews with visually impaired software engineers add to the research by giving personal stories and expert opinions on current issues in technology and accessibility. The study also looks at different tech tools and platforms to see how useful and accessible they are. This gives a full picture of how accessibility is currently going in software engineering. Participants in a research I designed through google form with six responses to examine issues faced by blind people in software engineering and related professions noted a number of significant hurdles. The inaccessibility of classwork, especially its visual components, which are frequently not designed with people with visual impairments in mind, was one of the main complaints raised. The general absence of accessibility features in software, which hinders blind people from doing activities as well as their sighted peers, was another major source of worry. Participants called attention to particular problems with graphical user interfaces that don't work with assistive devices like NVDA or JAWS. Additionally, it was observed that popular platforms such as Jira, Trello, AWS, and Microsoft Azure did not work well with screen readers on a variety of operating systems. A number of solutions were proposed in response to address these issues, one of which was the availability of learning materials that are accessible, such as electronic or Braille versions of textbooks. In order to facilitate efficient information access, emphasis was also focused on the usage of assistive technology like screen readers and tactile graphics. Another suggested strategy was to advocate for inclusive classroom practices, which calls for the use of teaching strategies that take into account students' varied learning needs. Additionally, there was a need for accessibility features to be built into software development from the beginning. This may be accomplished by working more closely with companies who provide screen readers. Further analysis of the study's participant data indicated a widespread sense of optimism regarding future developments in software accessibility. Concerns have been raised over the usage of accessibility overlays, though, as they frequently cause problems with screen reader performance and point to the need for more comprehensive accessibility solutions. This response emphasizes how crucial it is to include thorough accessibility standards in software development and educational tools in order to better assist those who are visually impaired in their academic and professional activities.

Statistical Data

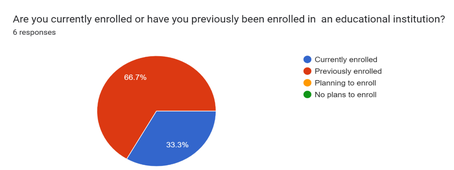

Figure 7: The graph shows a survey of the blind and visually impaired currently enrolled in an educational institute

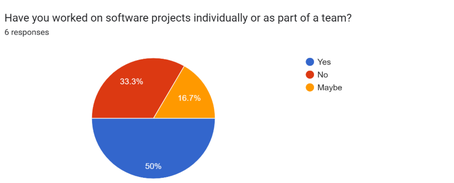

Figure 8: The graph shows a survey of the blind and visually impaired whom have worked on software projects either individually or part of a team

The survey gathered insights from blind and visually impaired individuals about their experiences and challenges in the field of software development. Respondents varied in gender, age, and education, with some currently or previously enrolled in educational institutions. Their familiarity with software development methodologies ranged from none to moderate, with Agile and Waterfall being more recognized than DevOps. Experience in software testing also varied, from none to hands-on testing of specific applications like Beam, and manual testing in professional settings. Programming proficiency showed a wide range—from no experience to advanced levels in Python and C++. Common challenges included accessibility issues in visual-based classwork, software without screen reader compatibility, and difficulties using platforms like Jira and AWS. Suggestions to overcome these included enhancing software accessibility, providing tailored assistive learning tools, collaborating with screen reader developers, and offering clearer educational resources. Respondents expressed hope that as technology evolves, so will the inclusivity of digital environments, making it easier for blind individuals to thrive in the tech industry. This shows the current state of the blind and visually impaired roles in the software engineering industry and how it's much harder to get opportunities working on software projects in a team. However, the blind and visually impaired are equally as talented as any other person getting into programming and software development with skillsets that are needed by companies and are as passionate to develop a project for companies.

Conclusion

The study shows that the roles and ideas of visually handicapped people in software engineering have changed over time. It talks about important efforts from people who have not only dealt with personal problems but also led the way in making technology easier for everyone to use. Dr. T.V. Raman's work on hearing interfaces is one example of how adaptive technologies can make workplaces more welcoming for everyone. In addition, the bigger effects of these efforts are talked about, like how they change industry standards and the way software is developed. People with disabilities aren't the only ones who benefit from accessible technologies. All users benefit because they make software more flexible and easy to use. This part stresses how important it is to keep researching and developing accessibility technologies in order to keep removing hurdles and making software engineering and related fields more accessible to everyone. People who are blind or visually impaired working in software engineering shows not only how far technology has come, but also how strong and creative this group is. Their work has led to big changes in software creation, pushing the limits of what is possible in terms of usability and accessibility. This study shows how important it is for the tech field to be diverse and include people with disabilities. This not only gives people with disabilities more power, but it also makes technology better for everyone. As software engineering changes, it needs to keep up with the needs of a wide range of users to make sure that new technologies are useful and easy for everyone to access.

Figure 9: BrailleNote Touch Plus 32